

EDITORIAL

Image-guided percutaneous ablation of pulmonary tumours

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Image-guided percutaneous local therapy using radiofrequency ablation (RFA) and laser-induced interstitial thermotherapy (LITT) has been used in liver tumours and non-hepatic lesions (e.g. osteoid osteoma) for several years^[1–4]. It has been shown to be effective and safe and can usually be performed under local anaesthesia. Recently, percutaneous tumour ablation has also been introduced for local therapy of pulmonary tumours^[5–7].

In January 2004, Professor Norbert Hosten, Department of Diagnostic and Interventional Radiology, Greifswald University, hosted the first German multidisciplinary meeting on percutaneous ablation of pulmonary metastases. At the conference a panel of experts covered all aspects of therapy of lung metastases (surgery, oncology, pneumology, RFA, LITT, and brachytherapy) as well as technical aspects of local tumour ablation. As a result several statements can be made to summarise the state-of-the-art in 2004.

Indications for 'curative' therapy

There are subsets of patients in which resection of pulmonary metastases results in prolonged survival and even 'cure'^[8]. Indications for metastasectomy depend on number, size, location, time course (metachronous vs. synchronous) of metastases, histological type of the primary tumour and absence or control of extrapulmonary tumour. Indications for percutaneous ablation of metastases should be the same as for resection. In the absence of proof of comparable efficacy of thermoablation and surgery, currently RFA or LITT

should only be performed in patients in whom resection is indicated but is technically not feasible due to unacceptable loss of lung parenchyma or cardiopulmonary contraindications for general anaesthesia or surgery. Particularly in patients with significant pleural adhesions percutaneous thermoablation appears justified.

In patients with peripheral lung cancer oncological resection including lobectomy and radical lymph node resection has been shown to be superior to limited (atypical) resection without lymphadenectomy^[9]. This is also likely to apply to local thermoablation. Therefore, percutaneous ablation in lung cancer should only be performed in cases in which interdisciplinary consensus (ideally in a tumour board) confirms that radical resection is not possible.

Indications for palliative therapy

In the palliative situation with local complications of lung tumours (e.g. chest wall invasion, atelectasis) thermoablation is likely to be more appropriate due to its low invasiveness.

Establishing the diagnosis of pulmonary metastases prior to ablation

Obviously, malignancy should be proven or be most likely before thermoablation. As morphological features rarely allow differentiation between pulmonary metastases and other—even benign—nodules the diagnosis

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usually requires demonstration of growth, enhancement at contrast-enhanced computed tomography (CT) or magnetic resonance imaging (MRI) or positive positron emission tomography scan. In uncertain cases percutaneous biopsy should be performed.

Patient preparation

Percutaneous tumour ablation using RFA or LITT can usually be performed with conscious sedation under local anaesthesia with acceptable patient discomfort^[6,7]. Probe placement should be done under CT guidance ideally using CT fluoroscopy. In lesions adjacent to the chest wall ultrasound guidance may be used.

Different types of probes (monopolar, bipolar, multipolar, single vs. multiple electrode design) are available. Currently neither the ideal probe type nor the optimum energy and duration of ablation are known. It appears that due to low conduction of heat in pulmonary parenchyma longer ablation with lower energy is required compared to ablation in the liver.

Follow-up of treated lesions is usually performed with CT. During the first 3 months an increase in the size of treated lesions as well as cavitation are normal findings and do not indicate ineffective treatment. Only further growth after 3 months suggests residual tumour or recurrence. The absence of perfusion at contrast-enhanced CT or MRI may be useful as early predictors of efficacy of therapy.

Side effects, complications

Percutaneous thermoablation with RFA or LITT is usually well tolerated. Pleuritic pain can be controlled

with non-steroidal analgesics and pleural effusion is mostly asymptomatic. Pneumothorax can and should be treated by the interventional radiologist during the ablation with aspiration or drainage. Other complications (e.g. haemorrhage) are rare.

Further research is required to clarify indications, optimise energy deployment in the tumour and analyse long-term results.

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